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John C. Stennis Space Center
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COMPLIANCE IS MANDATORY

John C. Stennis Space Center
HVAC AND DOMESTIC HOT WATER OPERATIONAL AND MAINTENANCE STANDARD FOR ENERGY CONSERVATION

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Document History Log

Change/ Revision	Date	Originator/ Phone	Description
Basic	09.27.2011	R. Harris Ext.3790	Initial release, superseding SSC-50-005 and SSC-50-006. This revision is compliant with the latest energy laws, including but not limited to: EISA 2007, E.O. 13514 and E.O. 13423.
Basic-1	02.11.2016	C. Wolfram Ext.81164	Administrative change. Replaced "FOSC" with "SACOM" throughout document.
A	07.11.2016	M. Killam Ext. 2032	Five-year review. Administrative changes throughout document. Revised cover sheet to reflect approval by NASA SSC Center Operations Design & Construction Project Management Division, and concurrence by NASA SSC Center Operations Directorate Operations and Maintenance Division. References and acronyms updated.

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1.0 PURPOSE

This John C. Stennis Space Center (SSC) standard (SSTD) defines the energy conservation practices, methods, and guidelines for the operation and maintenance of new and existing heating, ventilation and air conditioning (HVAC) systems at SSC for efficient utilization of energy.

These energy conservation practices, methods, and guidelines are required to ensure SSC's compliance with National Aeronautics and Space Administration (NASA) Agency requirements, Federal Laws, and Executive Orders.

2.0 APPLICABILITY

This SSTD is applicable to:

a. NASA/SSC personnel, SSC contractors, sub-contractors, and resident agencies; and,

b. All HVAC projects in new construction as well as building renovations, regardless of size.

3.0 APPLICABLE DOCUMENTS

Referenced documents shall be the latest edition unless otherwise specified.

ASHRAE Standard 55, *Thermal Environmental Conditions for Human Occupancy*

ASHRAE Standard 62.1, *Ventilation for Acceptable Indoor Air Quality*

ASHRAE Standard 90.1*, Energy Standard for Buildings Except Low-Rise Residential Buildings*

SPR 1440.1, *Records Management Program Requirements*

SSTD-8070-0005-CONFIG, *Preparation, Review, Approval and Release of SSC Standards*

4.0 RESPONSIBILITIES

a. SSC NASA organizations, contractors, sub-contractors, resident agencies, and organizations and their contractors and sub-contractors that deal with systems that consume energy shall comply with this SSTD and its requirements; ensure use of the correct version of this SSTD and the documents it references; and inform the appropriate organization of needed changes in accordance with SSTD-8070-0005-CONFIG.

b. Responsibilities for the use and control of this SSTD and for the review and approval of revisions or cancellation of this SSTD shall be as specified in SSTD-8070-0005-CONFIG and the applicable documents referenced therein.

c. Supervisors shall be responsible for ensuring all personnel under their direction comply with the requirements within this SSTD.

5.0 OPERATIONAL CRITERIA

Each specific area of a building shall be carefully evaluated for its specific HVAC requirements.

5.1 HVAC System Operation

a. HVAC systems shall be operated in accordance with relevant ASHRAE 90.1 sections so energy consumption is minimized.

b. Routine maintenance on equipment shall be as per section 6.0 of this SSTD.

c. Replacement equipment shall be Energy Star efficiency rated, where possible.

d. Existing systems and equipment shall not be modified from manufacturers and/or designed configuration without following Design and Configuration Control Requirements. Repairs shall not modify such configurations or otherwise adversely impact equipment efficiency or operation. New equipment shall not be installed without following Design and Configuration Control Requirements.

5.1.1 Space Thermostat Settings

a. Temperature set points shall be per ASHRAE Standard 55, where applicable; but in no case may the cooling mode be less than 72°F or the heating mode be greater than 74°F.

Exceptions: Temperature set points outside of those listed in Section 5.1.1.a must be approved by the NASA Energy Manager and meet the following requirements:

1. For specialized equipment requiring space temperatures outside those listed in Section 5.1.1.a, documentation on manufacturer's letterhead indicating acceptable minimum and maximum temperature set points shall be provided to the NASA Energy Manager for each piece of equipment. At his/her discretion, the NASA Energy Manager may require additional supporting documentation before rendering a decision.

2. For personnel requiring space temperatures outside those listed in Section 5.1.1.a, documentation from an independent source, such as a medical professional, outlining the person's need as well as acceptable minimum and maximum temperature set points shall be provided to the NASA Energy Manager. At his/her discretion, the NASA Energy Manager may require additional supporting documentation before rendering a decision.

b. Temperature dead bands shall be established for all zones per ASHRAE 90.1, where applicable.

5.1.2 HVAC System Control

a. HVAC will be energized to provide comfort conditions only during normal working hours. Deviations from this schedule shall be approved by the NASA Energy Manager before implementation.

b. Managers and Supervisors shall monitor their areas to ensure thermostats, humidistats, and other HVAC equipment in their areas are being operated in a manner to ensure continued compliance with ASHRAE, NASA Requirements, and Federal Laws. All employees are discouraged from setting thermostats to extremes. Problems with heating/cooling levels are to be reported to Energy Management Control System (EMCS) for proper investigation.

5.1.3 EMCS

a. HVAC systems for permanent buildings at SSC will be under the control of the EMCS. Equipment under the control of the EMCS shall be routinely operated in the "normal/automatic" mode.

b. The EMCS will control HVAC system cycling, starting and stopping system functions, and monitor for system failure. It will also analyze data for system failure predictions.

c. On a monthly basis, EMCS personnel shall provide the NASA Energy Manager with a report showing the areas where temperature set points are not in compliance.

d. On a monthly basis, EMCS personnel shall provide the NASA Energy Manager with a report showing which equipment is in Operator Priority and the reason for the equipment being in that state.

e. Equipment control sequences of operations should be approved by NASA/Synergy Achieving Consolidated Operations and Maintenance (SACOM) Energy Manager, and changes to sequences should go through configuration control.

5.2 Ventilation

The position of the outside air intake dampers for the Air Handling Unit (AHU) during peak heating and cooling seasons shall be adjusted based on the requirements of ASHRAE Standard 62.1.

5.3 Unoccupied Zones or Buildings

a. Occupied hours are considered to be 6 a.m. to 6 p.m., Monday through Friday. All other times are to be considered unoccupied.

b. The HVAC system, which services an unoccupied zone or building, shall either be shut off or placed in an "Unoccupied" mode of operation and remain until such time as it is either turned back on or placed in an "occupied" mode of operation.

c. A HVAC system which services a non-critical zone within a building containing critical zone(s) shall not remain on at the end of the work day unless it has been determined that less energy is consumed by the system remaining on due to improved overall system efficiency.

d. Buildings in "unoccupied" mode should control humidity at a maximum of 65%.

5.4 Seasonal Shutdown

HVAC equipment such as boilers, associated pumps, heat left machines, etc., serving non-critical areas shall be shut down during the cooling season.

5.5 Domestic Hot Water

a. Hot water for domestic use shall be controlled at 110° F or less.

b. Kitchens, showers, and special purpose labs may require water at temperatures in excess of 110° F. Therefore, these areas should have localized heaters and obtain authorization from the NASA Energy Manager for operation of the central system at a higher temperature.

c. Existing systems and equipment shall not be modified from manufacturers and/or designed configuration without following Design and Configuration Control Requirements. Repairs shall not modify such configurations or otherwise adversely impact equipment efficiency or operation. New equipment shall not be installed without following Design and Configuration Control Requirements.

d. Installation of individual water heaters in areas served by a building-wide domestic water heating systems shall not be allowed unless proven to be life-cycle cost effective and approved by the NASA Energy Manager.

6.0 MAINTENANCE REQUIREMENTS

6.1 General

To conserve energy requires equipment to be maintained in optimum operating condition. This section defines maintenance requirements for certain HVAC systems. The following sections are not a comprehensive list of maintenance requirements. Full maintenance requirements are located on the Operations and Maintenance web page, and referenced requirements shall be the latest edition unless otherwise specified.

6.2 Pumps

Pumps shall be maintained in accordance with the current requirements of the SACOM Contract, Maintenance Task Sheet M-8, *Pumps (Chilled Water, Hot Water, and Condenser Water).*

6.3 AHU

AHUs shall be maintained in accordance with the current requirements of the SACOM Contract Maintenance Task Sheet M-9, *Air Handling Unit.*

6.4 Centrifugal Chiller

Centrifugal chillers shall be maintained in accordance with the current requirements of the SACOM Contract Maintenance Task Sheet M-1, *Centrifugal Chiller.*

6.5 Reciprocating Chiller

Reciprocating chillers shall be maintained in accordance with the current requirements of the SACOM Contract Maintenance Task Sheet M-2, *Reciprocating Chiller*.

6.6 Fan, Blower or Vent

Fans, blowers, and vents shall be maintained in accordance with the current requirements of the SACOM Contract Maintenance Task Sheet M-14, *Fans, Blowers, or Vents*.

6.7 Boilers

Boilers shall be maintained in accordance with the current requirements of the SACOM Contract Maintenance Task Sheet M-5, *Boiler (Gas)*.

7.0 RECORDS AND FORMS

a. Records and forms required by the procedures of this standard shall be maintained in accordance with SPR 1440 and are assumed to be the latest edition unless otherwise indicated.

b. Quality Records are identified in the SSC Master Records Index. Task sheets are located on the Operations and Maintenance section of the SACOM web page.

c. Records/forms for the maintenance requirements of this standard include, but are not limited to, the following SSC Maintenance Task Sheets:

1. Task Sheet M-1, *Centrifugal Chiller*
2. Task Sheet M-2, *Reciprocating Chiller*
3. Task Sheet M-5, *Boiler (Gas)*
3. Task Sheet M-8, *Pumps (Chilled Water, Hot Water, and Condenser Water)*
4. Task Sheet M-9, *Air Handling Unit*
5. Task Sheet M-14, *Fans, Blowers, or Vents*

8.0 DEFINITIONS

Air Handling Unit	A package unit containing a fan, motor, cooling coil, heating coil (hot water or electric), filters, air dampers, and controls from which cooled or heated air is distributed to a zone. Terminal reheat may replace heating coil.
Dead Band	The difference in heating and cooling temperature set points.
HVAC System	A system that provides, either collectively or individually, the processes of comfort heating, ventilating, and/or cooling within or associated with buildings.

Normal Work Hours	Established based on the occupancy schedules and system functions required to support SSC missions.
Occupied	Occupied hours are considered to be 6 a.m. to 6 p.m., Monday through Friday.
System	A combination of equipment and/or controls, accessories, interconnecting means, and terminals elements by which energy is transformed so as to perform a specific function.
Unoccupied	Occupied hours are considered to be 6 a.m. to 6 p.m., Monday through Friday. All other times are to be considered unoccupied.
Zone	A space or group of spaces within a building whose heating and/or cooling requirements are maintained throughout by a single controlling device.

9.0 ABBREVIATIONS

AHU	Air Handling Unit
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineering
°F	Degrees Fahrenheit
EMCS	Energy Management Control System
HVAC	Heating, Ventilation and Air Conditioning
NASA	National Aeronautics and Space Administration
SACOM	Synergy-Achieving Consolidated Operations and Maintenance
SPR	Stennis Procedural Requirement
SSC	John C. Stennis Space Center
SSTD	Stennis Space Center Standard